Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended): An apparatus for controlling the operation of a continuously variable transmission (CVT) having hydraulically operated primary and secondary pulleys with varying effective diameters, and a drive belt coupling the primary pulley to the secondary pulley, comprising:

a programmable controller; and

means associated with said controller for mapping rate of change of ratio to clamping pressure and/or differential pressure between said pulleys in said CVT, and for dynamically controlling acceleration and deceleration of said vehicle from rate of change of ratio;

a primary pump fluidly connected to said primary pulley; and

a secondary pump fluidly connected to said secondary pulley;

wherein said primary and secondary pumps are not fluidly connected.

2. (currently amended): An apparatus as recited in claim 1, further comprising ~~a hydraulic servo control system adapted for control by said programmable controller and for control of clamping pressure and differential pressure between pulleys in said CVT~~ a torque clipping algorithm is used to throttle back the torque to the primary pulley when the clamping pressure is insufficient to prevent slipping of said drive belt.

3. (currently amended): An apparatus for controlling the rate of change ratio in a continuously variable transmission (CVT) having hydraulically operated primary and secondary pulleys with varying effective diameters, and a drive belt coupling the primary

pulley to the secondary pulley, comprising:

a programmable controller;

programming associated with said controller for mapping rate of change of ratio to clamping pressure and/or differential pressure between said pulleys in said CVT, and for dynamically controlling acceleration and deceleration of said vehicle from rate of change of ratio;

a pressure pump fluidly connected to said secondary pulley;

wherein said pressure pump has a bypass control valve that opens below a predetermined pressure; and

a shift pump fluidly connected to said primary pulley;

wherein said shift pump is fluidly connected to said pressure pump.

4. (currently amended): An apparatus as recited in claim 3, further comprising ~~a hydraulic servo control system adapted for control by said programmable controller and for control of clamping pressure and differential pressure between pulleys in said CVT~~ a torque clipping algorithm is used to throttle back the torque to the primary pulley when the clamping pressure is insufficient to prevent slipping of said drive belt.

5. (currently amended): An apparatus for controlling the operation of a continuously variable transmission (CVT) having hydraulically operated primary and secondary pulleys with varying effective diameters, and a drive belt coupling the primary pulley to the secondary pulley, comprising:

a programmable controller;

an algorithm or map associated with said controller, wherein said algorithm or map determines clamping pressure and/or differential pressure level between said pulleys in said CVT for achieving a desired rate of change in ratio in said CVT for dynamically controlling acceleration and deceleration of said vehicle;

a pressure pump fluidly connected to said secondary pulley;

a shift pump fluidly connected to said primary pulley;

wherein said shift pump is fluidly connected to said pressure pump; and

wherein the pressure on said secondary pulley is raised instead of lowering the pressure on said primary pulley when said CVT is shifted toward low gear.

6. (currently amended): An apparatus as recited in claim 5, further comprising ~~a hydraulic servo control system adapted for control by said programmable controller and for control of clamping pressure and/or differential pressure between pulleys in said CVT~~ a bypass control valve fluidly connected to said pressure pump that opens below a predetermined pressure.

7. (currently amended): An apparatus for optimizing the operation of a continuously variable transmission (CVT) having hydraulically operated primary and secondary pulleys with varying effective diameters, and a drive belt coupling the primary pulley to the secondary pulley, comprising:

a control computer; ~~and~~

programming associated with said control computer for carrying out the operations of controlling primary and secondary pulley pressure of a CVT to achieve a commanded clamping pressure in response to an input torque command and commanded ratio rate or shift velocity based on a mapping of empirical data relating to pressure, ratio rate, and torque;

~~wherein acceleration and deceleration of said vehicle is dynamically controlled by controlling rate of change of ratio~~

a primary pump fluidly connected to said primary pulley;

a secondary pump fluidly connected to said secondary pulley;

wherein said primary and secondary pumps are not fluidly connected; and

wherein the pressure on said secondary pulley is raised instead of lowering the pressure on said primary pulley when said CVT is shifted toward low gear.

8. (previously amended): An apparatus as recited in claim 7, further comprising a hydraulic servo control system adapted for control of said primary and secondary pulley pressure in response to said control computer.

9. (currently amended): An apparatus for optimizing the operation of a continuously variable transmission (CVT), comprising:

(a) a control computer; and

(b) programming associated with said control computer for

(i) accessing a map of the relationship between pressure of a CVT and rate of change of ratio to transmit a given amount of torque, ~~and~~

(ii) controlling primary and second pulley pressure of the CVT to achieve a commanded clamping pressure for commanded torque and ratio rate based on said map;

wherein acceleration and deceleration of said vehicle is dynamically controlled by controlling ratio of change of ratio; and,

(iii) a torque clipping algorithm adapted to throttle back the torque to the primary pulley when the clamping pressure is insufficient to prevent slippage in the CVT.

10. (previously amended): An apparatus as recited in claim 9, further comprising a hydraulic servo control system adapted for control of said primary and secondary pulley pressure in response to said control computer.

11. (currently amended): An apparatus for optimizing the operation of a continuously variable transmission (CVT), comprising:

(a) a control computer; and

(b) programming associated with said control computer for carrying out the

operations of controlling primary and secondary pulley pressures of the CVT to control the ratio rate and/or ratio and clamping pressure of the CVT based on an equilibrium ratio map of the CVT and the pressure relationship between the ratio rate of the CVT and the distance between the point corresponding to the current states of the CVT and the projection of this point onto said equilibrium ratio map;

wherein acceleration and deceleration of said vehicle is dynamically controlled by controlling rate of change of ratio; and

wherein a torque clipping algorithm is used to throttle back the torque to the primary pulley when the clamping pressure is insufficient to prevent slippage in the CVT.

12. (original): An apparatus as recited in claim 11, further comprising a hydraulic servo control system adapted for control of said primary and second pulley pressure in response to said control computer.

13. (currently amended): An apparatus for controlling the operating of a continuously variable transmission (CVT) having hydraulically operated primary and secondary pulleys with varying effective diameters, and a drive belt coupling the primary pulley to the secondary pulley, comprising:

a servo control system;

said servo control system configured to control clamping pressure and differential pressure between said primary and secondary pulleys in the CVT;

a control computer; ~~and~~

programming associated with said control computer for controlling said servo j system to achieve commanded clamping pressure and/or differential pressure between the primary and secondary pulleys based on a mapping of rate of change of ratio of said CVT to said clamping pressure and/or differential pressure between said pulleys;

wherein acceleration and deceleration of said vehicle is dynamically controlled by

controlling ratio of change of ratio;

wherein the pressure on said secondary pulley is raised instead of lowering the pressure on said primary pulley when said CVT is shifted toward low gear; and

wherein a torque clipping algorithm is used to throttle back the torque to said primary pulley when the clamping pressure is insufficient to prevent slipping of said drive belt.

14. (currently amended): A hybrid electric vehicle, comprising:

a continuously variable transmission (CVT):

said CVT having hydraulically operated primary and secondary pulleys with varying effective diameters;

a drive belt coupling the primary pulley to the secondary pulley;

a primary pump fluidly connected to said primary pulley;

a secondary pump fluidly connected to said secondary pulley;

wherein said primary and secondary pumps are not fluidly connected;

an internal combustion engine coupled to the CVT;

an electric motor coupled to the output of the internal combustion engine;

a system controller configured to operate said motor simultaneously with said engine and apply motor torque to said engine output to maintain engine power or torque output substantially along a predetermined operating line;

said system controller further configured to control rate of change of ratio of said continuously variable transmission;

wherein said system controller dynamically varies acceleration and deceleration of said vehicle by varying motor torque and rate of change of ratio of said continuously variable transmission; and

means associated with said controller for mapping rate of change of ratio to clamping pressure and/or differential pressure between said pulleys in said CVT.

15. (currently amended): A hybrid electric vehicle as recited in claim 14, further comprising ~~a hydraulic servo control system adapted for control by said system controller and for control of clamping pressure and differential pressure between pulleys in said CVT~~
a torque clipping algorithm used to throttle back the torque to said primary pulley when the clamping pressure is insufficient to prevent slipping of said drive belt.

16. (currently amended): A hybrid electric vehicle, comprising:

a continuously variable transmission (CVT);

said CVT having hydraulically operated primary and secondary pulleys with varying effective diameters;

a drive belt coupling the primary pulley to the secondary pulley;

a pressure pump fluidly connected to said secondary pulley;

wherein said pressure pump has a bypass control valve that opens at low pressures;

a shift pump fluidly connected to said primary pulley;

wherein said shift pump is fluidly connected to said pressure pump;

an internal combustion engine coupled to the CVT;

an electric motor coupled to the output of the internal combustion engine;

a system controller configured to operate said motor simultaneously with said engine and apply motor torque to said engine output to maintain engine power or torque output substantially along a predetermined operating line;

said system controller further configured to control rate of change of ratio of said continuously variable transmission;

wherein said system controller dynamically varies acceleration and deceleration of said vehicle by varying motor torque and rate of change of ratio of said continuously variable transmission; and

programming associated with said system controller for mapping rate of change

of ratio to clamping pressure and/or differential pressure between pulleys in said CVT.

17. (currently amended): A hybrid electric vehicle as recited in claim 16, further comprising ~~a hydraulic servo control system adapted for control by said system controller and for control of clamping pressure and differential pressure between pulleys in said CVT~~
a torque clipping algorithm is used to throttle back the torque to the primary pulley when the clamping pressure is insufficient to prevent slipping of said drive belt.

18. (currently amended): A hybrid electric vehicle, comprising:

a continuously variable transmission (CVT);

said CVT having hydraulically operated primary and secondary pulleys with varying effective diameters;

a drive belt coupling the primary pulley to the secondary pulley;

a pressure pump fluidly connected to said secondary pulley;

a shift pump fluidly connected to said primary pulley;

wherein said shift pump is fluidly connected to said pressure pump;

wherein the pressure on said secondary pulley is raised instead of lowering the pressure on said primary pulley when said CVT is shifted toward low gear;

an internal combustion engine coupled to the CVT;

an electric motor coupled to the output of the internal combustion engine;

a system controller configured to operate said motor simultaneously with said engine and apply motor torque to said engine output to maintain engine power or torque output substantially along a predetermined operating line;

said system controller further configured to control rate of change of ratio of said continuously variable transmission;

wherein said system controller dynamically varies acceleration and deceleration of said vehicle by varying motor torque and rate of change of ratio of said continuously variable transmission; and

an algorithm or map associated with said system controller, wherein said algorithm or map determines clamping pressure and/or differential pressure level between pulleys in said CVT for achieving a desired rate of change in ratio in said CVT.

19. (currently amended): A hybrid electric vehicle as recited in claim 18, further comprising ~~a hydraulic servo control system adapted for control by said programmable controller and for control of clamping pressure and differential pressure between pulleys in said CVT~~a bypass control valve fluidly connected to said pressure pump that opens below a predetermined pressure.

20. (currently amended): A hybrid electric vehicle, comprising:

a continuously variable transmission (CVT);

said CVT having hydraulically operated primary and secondary pulleys with varying effective diameters;

a drive belt coupling the primary pulley to the secondary pulley;

a primary pump fluidly connected to said primary pulley;

a secondary pump fluidly connected to said secondary pulley;

wherein said primary and secondary pumps are not fluidly connected;

wherein the pressure on said secondary pulley is raised instead of lowering the pressure on said primary pulley when said CVT is shifted toward low gear;

an internal combustion engine coupled to the CVT;

an electric motor coupled to the output of the internal combustion engine;

a system controller configured to operate said motor simultaneously with said engine and apply motor torque to said engine output to maintain engine power or torque output substantially along a predetermined operating line;

said system controller further configured to control rate of change of ratio of said continuously variable transmission;

wherein said system controller dynamically varies acceleration and deceleration of said vehicle by varying motor torque and rate of change of ratio of said continuously variable transmission; and

programming associated with said system controller for carrying out the operations of controlling primary and secondary pulley pressure of a CVT to achieve a commanded clamping pressure in response to an input torque command and commanded ratio rate or shift velocity based on a mapping of empirical data relating pressure, ratio rate, and torque.

21. (original): A hybrid electric vehicle as recited in claim 20, further comprising a hydraulic servo control system adapted for control of said primary and second pulley pressure in response to said system controller.

22. (currently amended): A hybrid electric vehicle, comprising:

a continuously variable transmission (CVT):

an internal combustion engine coupled to the CVT;

an electric motor coupled to the output of the internal combustion engine;

a system controller configured to operate said motor simultaneously with said engine and apply motor torque to said engine output to maintain engine power or torque output substantially along a predetermined operating line;

said system controller further configured to control rate of change of ratio of said continuously variable transmission;

wherein said system controller dynamically varies acceleration and deceleration of said vehicle by varying motor torque and rate of change of ratio of said continuously variable transmission; and

programming associated with said system controller computer for

(i) accessing a map of the relationship between pressure of a CVT and rate of change of ratio to transmit a given amount of torque, and

(ii) controlling primary and second pulley pressure of the CVT to achieve a commanded clamping pressure for commanded torque and ratio rate based on said map; and

(iii) a torque clipping algorithm adapted to throttle back the torque to the primary pulley when the clamping pressure is insufficient to prevent slippage in the CVT.

23. (original): A hybrid electric vehicle as recited in claim 22, further comprising a hydraulic servo control system adapted for control of said primary and second pulley pressure in response to said system controller.

24. (currently amended): A hybrid electric vehicle, comprising:

a continuously variable transmission (CVT):

an internal combustion engine coupled to the CVT;

an electric motor coupled to the output of the internal combustion engine;

a system controller configured to operate said motor simultaneously with said engine and apply motor torque to said engine output to maintain engine power or torque output substantially along a predetermined operating line;

said system controller further configured to control rate of change of ratio of said continuously variable transmission;

wherein said system controller dynamically varies acceleration and deceleration of said vehicle by varying motor torque and rate of change of ratio of said continuously variable transmission; ~~and~~

programming associated with said system controller for carrying out the operations of controlling primary and secondary pulley pressures of the CVT to control the ratio rate and/or ratio and clamping pressure of the CVT based on an equilibrium

ratio map of the CVT and the pressure relationship between the ratio rate of the CVT and the distance between the point corresponding to the current states of the CVT and the projection of this point onto said equilibrium ratio map; and

wherein a torque clipping algorithm is used to throttle back the torque to the primary pulley when the clamping pressure is insufficient to prevent slippage in the CVT..

25. (original): A hybrid electric vehicle as recited in claim 11, further comprising a hydraulic servo control system adapted for control of said primary and second pulley pressure in response to said system controller.

26. (currently amended): A hybrid electric vehicle, comprising:

a continuously variable transmission (CVT);

said CVT having hydraulically operated primary and secondary pulleys with varying effective diameters;

a drive belt coupling the primary pulley to the secondary pulley;

wherein the pressure on said secondary pulley is raised instead of lowering the pressure on said primary pulley when said CVT is shifted toward low gear;

wherein a torque clipping algorithm is used to throttle back the torque to said primary pulley when the clamping pressure is insufficient to prevent slipping of said drive belt;

an internal combustion engine coupled to the CVT;

an electric motor coupled to the output of the internal combustion engine;

a system controller configured to operate said motor simultaneously with said engine and apply motor torque to said engine output to maintain engine power or torque output substantially along a predetermined operating line;

said system controller further configured to control rate of change of ratio of said continuously variable transmission;

wherein said system controller dynamically varies acceleration and deceleration of said vehicle by varying motor torque and rate of change of ratio of said continuously variable transmission;

a servo control system;

said servo control system configured to control clamping pressure and differential pressure between said primary and secondary pulleys in the CVT; and

programming associated with said system controller for controlling said servo control system to achieve commanded clamping pressure and/or differential pressure between the primary and secondary pulleys based on a mapping of rate of change of ratio of said CVT to said clamping pressure and/or differential pressure between pulleys.

Claims 27-32 (canceled)